

Esercizi.

Integrali multipli

Calcolare l'integrale delle seguenti funzioni sugli insiemi indicati:

- a) $f(x, y) = 5x + 1$, $A = \{(x, y) \in \mathbb{R}^2 : x^2 \leq y + 1 \leq 8, x \leq -1\}$
- b) $f(x, y) = 3x$, $A = \{(x, y) \in \mathbb{R}^2 : 2y^2 \leq x \leq y^2 + 4\}$
- c) $f(x, y) = 1$, $A = \{(x, y) \in \mathbb{R}^2 : x^2 + 4y^2 \leq 4, |y| \leq x\}$
- d) $f(x, y) = 1$, $A = \{(x, y) \in \mathbb{R}^2 : x^2 + y^2 \leq 9, y^2 \geq -x\}$
- e) $f(x, y) = e^{-y^2}$, $A = \{(x, y) \in \mathbb{R}^2 : 0 \leq x \leq y \leq 1\}$
- f) $f(x, y) = 2x + 3y$, $A = \{(x, y) \in \mathbb{R}^2 : -1 \leq 2x + 3y \leq 4, 5 \leq x - y \leq 7\}$
- g) $f(x, y) = e^{3x+7y}$, $A = \{(x, y) \in \mathbb{R}^2 : (3x + 7y)^2 \leq x - 2y \leq 8\}$
- h) $f(x, y) = 2x + y$, $A = \{(x, y) \in \mathbb{R}^2 : 4 \leq x^2 + y^2 \leq 9, |y| \leq x\}$
- i) $f(x, y) = 1$, $A = \{(x, y) \in \mathbb{R}^2 : 9x^2 + 4y^2 \leq 1, \sqrt{3}x \leq 2y\}$
- l) $f(x, y, z) = 1$, $A = \{(x, y, z) \in \mathbb{R}^3 : x^2 + z^2 \leq y^2 + 1 \leq 2\}$
- m) $f(x, y, z) = 1$, $A = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 \leq 9, y^2 + z^2 \leq x\}$
- n) $f(x, y, z) = y$, $A = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 \leq 4, x^2 + z^2 \leq y^2\}$
- o) $f(x, y, z) = 1$, $A = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 \leq 4, x \geq 1\}$
- p) $f(x, y, z) = y^2$, $A = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 \leq 4\}$
- q) $f(x, y, z) = x^2z$, $A = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 \leq 9, |z| \leq 1\}$
- r) $f(x, y, z) = 1$, $A = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 \leq 4, -3 \leq z \leq x^2 + y^2\}$
- s) $f(x, y, z) = x$, $A = \{(x, y, z) \in \mathbb{R}^3 : (x - 1)^2 + (y - 2)^2 + (z - 3)^2 \leq 4\}$
- t) $f(x, y, z) = 1$, $A = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 \leq 4, x^2 + y^2 \geq z^2 + 2, z \leq 0\}$
- u) $f(x, y, z) = z^2$, $A = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 \leq 4, x^2 + y^2 \geq z^2 + 2\}$
- v) $f(x, y, z) = 1$, $A = \{(x, y, z) \in \mathbb{R}^3 : \frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} \leq 1, a, b, c > 0\}$
- z) $f(x, y, z) = 1$, $A = \{(x, y, z) \in \mathbb{R}^3 : \frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} \leq 1, |z| \leq 1, a, b, c > 0\}$